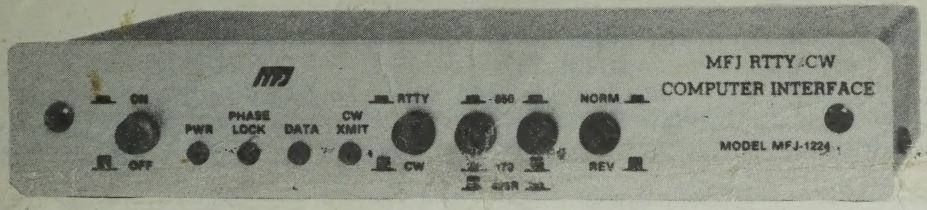
# MFJ RTTY/CW
# COMPUTER INTERFACE




## MODEL MFJ-1224

## OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


1200-0109-1224

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# MFJ-1224 RTTY/CW COMPUTER INTERFACE

Thank you for purchasing the MFJ-1224 Interface. The MFJ-1224 will allow you to transmit and receive RTTY and CW when used with your transceiver. During reception, the MFJ-1224 converts the CW or AFSK tones from your reciever into computer compatible TTL level signals. The computer then translates these signals into the represented alpha-numeric characters and displays them on the screen. In the Transmit mode, the computer generates the TTL signals which are converted by the interface into AFSK tones for RTTY or into CW keying for CW transmission.

NOTE: The interpretation of the TTL signals requires a specialized HAM program which is not provided with the interface. This allows you to select a program which is compatible with your computer and which has the features you want.

When unpacking, make sure that all of these items are included: 1 interface, 1 four pin mic plug, 1 RCA cable, 1 five pin plug, 1 mic cable with five pin plug attached, 1 owner's manual. NOTE: 12 VDC AC adapter is optional.

## FRONT PANEL

The front panel controls and indicators consist of five push button switches and four LEDs. From left to right, they are as follows:

ON/OFF This switch controls the power to the interface.

POWER LED This indicator is lit when the power is on.

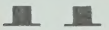
PHASE LOCK LED This indicator is used with the DATA indicator to aid in tuning the receiver. It indicates when the interface is locked onto an RTTY signal. It flashes with the Morse code tone for CW reception (flashes in time with Morse code).

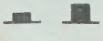
DATA LED This indicator is used with the PHASE LOCK indicator to aid in tuning the receiver. It flashes on and off with the RTTY shift and also flashes with the Morse code tone for CW reception.

CW TRANSMIT LED This indicator is activated by the CW keying circuit. It flashes during CW transmission.

RTTY/CW This switch selects either the RTTY or CW mode of operation.

The next two switches control the shift used for RTTY.


In this position, the interface sends and receives with a 850Hz audio shift.


In this position, the interface receives and sends with a 170Hz audio shift.

In this position, the interface receives with a 425 Hz shift and sends 170Hz shift.

In this position, the interface receives with a 425Hz shift and sends 850Hz shift.

NORM/REV This switch inverts the demodulated RTTY signal being sent to the computer.

DIP SWITCH There is an eight switch DIP package on the PC board. These switches are used to configure the inputs and outputs of the general purpose connector to work correctly with your computer and software. The following chart illustrates functions of each switch.

| SWITCH | POSITION | FUNCTION | SIGNAL AT PIN |
|---|---|---|---|
| 1 | ON | CW KEY | LOW-KEY |
| 1 | OFF | CW KEY | HIGH-KEY |
| 2 | ON | CW ID KEY | HIGH-CW-SHIFT |
| 2 | OFF | CW ID TONE | LOW-CW-SHIFT |
| 3 | ON | KANTRONICS PTT | N/A |
| 3 | OFF | GENERAL PTT | N/A |
| 4 | ON | RTTY INPUT | LOW MARK |
| 4 | OFF | RTTY INPUT | HIGH MARK |
| 5 | ON | GENERAL PTT | N/A |
| 5 | OFF | KANTRONICS PTT | N/A |
| 6 | ON | PTT INPUT | HIGH PTT |
| 6 | OFF | PTT INPUT | LOW PTT |
| 7 | ON | CW DEMOD OUTPUT | LOW TONE |
| 7 | OFF | CW DEMOD OUTPUT | HIGH TONE |
| 8 | ON | RTTY DEMOD OUTPUT | LOW MARK |
| 8 | OFF | RTTY DEMOD OUTPUT | HIGH MARK |

## CONNECTION

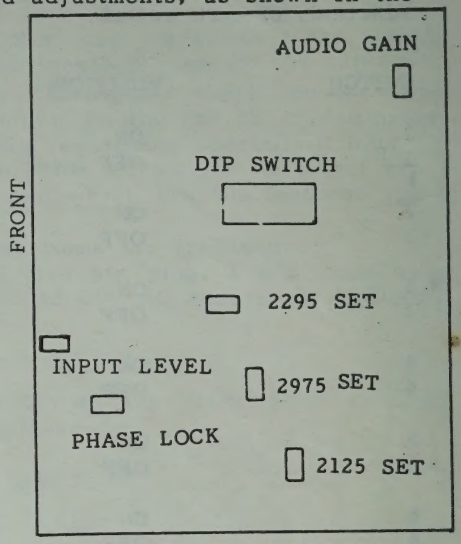
FOR CW For transmission and reception of CW the following connections are necessary.

1) A 12 VDC power supply to the POWER jack of the interface.
2) A shielded audio cable from the external speaker jack of the transcieiver to the AUDIO IN jack of the interface.
5) If desired, a speaker may be connected to the SPEAKER OUT jack of the interface.
4) If the interface is to be used to key the transmitter by hand, the key should be connected to the KEY IN jack.
5) The control (not supplied with 1224) from the computer to the interface.
6) A cable from one of the KEY OUT jacks of the interface to the KEY IN jack of the transceiver. If you are not sure whether your transceiver requires GRID BLOCK or DIRECT keying, try one and then the other to see which one works. No damage will be done if the wrong one is selected.

## INTERNAL CONTROLS

CAUTION: Improper adjustments of the internal controls will prevent the interface from functioning.

The MFJ-1224 has several internal controls and adjustments, as shown in the diagram and described below.




AUDIO OUT GAIN This controls the level of the audio for AFSK output. It is preset at the factory to a reasonable level for most transmitters. Some adjustments may be required if your trasmitter requires a higher or lower setting. The best results usually occur with high level from the interface and a low MIC gain setting on the transmitter.

INPUT LEVEL It is very important the the input is set to the proper level for use with your rig. first tune the radio until no signal is heard (static only). Turn the input level pot to the point where the static does not cause the "PHASE LOCK LED" to light on flicker.

The next four pots controls the AFSK frequencies for sending and receiving. They are calibrated at the factory and should not require resetting unless extended use causes the frequencies to drift. The calibration procedure requires only a frequency counter.

TO CALIBRATE Connect a frequency counter to the AFSK OUT and AFSK SHIELD pins. Disconnect all other inputs and outputs to the interface except for the power supply. Set switch number four and two of the DIP package to the ON position. Use the 2125 SET pot to set the mark to 2125 HZ.

Set the number four DIP switch to the OFF position and the front panel switches to the 170 position. Use the 2295 SET pot to the Space frequency to 2295 Hz.

Now set the switch to the 850 position and use the 2975 SET pot to set the Space frequency to 2975 HZ.

Remove the frequency counter and connect the AFSK output to the AUDIO IN jack. Turn the AUDIO OUT GAIN pot fully clockwise as viewed from the front of the box (first mark its present position so that it may reset after the calibration is completed). Set the number four DIP to the ON position and the front panel switches to the 170 position. Turn the PHASE LOCK pot fully clockwise (as viewed from the right side), then slowly turn the pot counter-clockwise until the PHASE LOCK LED just lights. Mark this position. Continue turning counter-clockwise until the LED just goes out. Mark this position. Center the pot between these two marks. Return the AFSK OUT GAIN pots to its original position. The interface should now be properly calibrated for RTTY transmission and reception.

FOR RTTY /ASCII For transmission and reception of RTTY or ASCII signals the following connections are needed:

1) 12 VDC power supply to the POWER jack of the interface.

2) A shielded audio cable from the external speaker jack of the transceiver to the AUDIO IN jack of the interface.

3) If desired, a speaker may be connected to the SPEAKER OUT jack of the interface.

4) The microphone/PTT cable to the transmitter. This cable is supplied with the proper push on connector on one end and with the other end unwired. This allows the cable to be connected properly for various types of transmitters. Consult the owner's manual for your transceiver to determine the proper connection of the mic jack. The white wire is the audio line, the red wire is the PTT line, the black wire is the PTT ground line, the bare (shield) wire is the audio ground and the green wire is the FSK line.

5) The control cable (not supplied with 1224) from the computer to the interface.

6) If the interface is to drive a TTY current loop, the TTY should be connected to the LOOP OUT jack.

## OPERATION

In RTTY/ASCII and CW operation, the tuning of the receiver is the key to proper reception. Follow the guidelines below, but feel free to experiment. The optimum settings will vary from one rig to the next.

FOR RTTY/ASCII Connect the interface as described above . Load your HAM program and tune up your transceiver. Set the transceiver for lower sideband operation.

To receive RTTY or ASCII set the interface to the RTTY and 850 position and begin tuning the receiver until a station is heard.

With the program set for 60 word per minute (WPM) operation, slowly tune the receiver so that the RTTY signal begins at a low pitch and slowly rises. Watch the PHASE LOCK and DATA LEDs. When the receiver is properly tuned, the PHASE LOCK LED will light and remain lit, while the DATA LED blinks in time to the tone shifts. Try both the 170 and the 850 positions to see which provides the clearest copy.

If the signal appears to be received properly but the screen display is garbled, try changing the reception speed or changing the NORM/REV switch.

To transmit RTTY/ASCII enter the transmit mode of your program. If the mic cable is hooked up correctly the transmitter should key and transmit any characters entered into the keyboard.

To receive CW, set the interface to the CW position and the program to the CW mode. Tune the receiver until a Morse signal is heard. Starting with a low pitched tone tune the receiver so that the pitch rises. When the receiver is tuned properly the PHASE LOCK and DATA LEDs should blink together in time with the CW signal. If the signal is very noisy, it will be necessary to set the volume of the receiver low enough that static does not cause the LEDs to light.

IMPORTANT: For best reception, the receiver should be tuned to give a CW tone of approimately 2210 Hz. This is because the 8-pole filter and the phase lock frequency are centered at 2210 Hz. If your receiver has a narrow bandwidth CW filter, you may have to switch to lower sideband.

To transmit CW, set the program to the transmit position and the transceiver to transmit. Characters entered into the keyboard will be heard on the transceiver as it is keyed.

NOTE: In both RTTY/ASCII and CW operation, some signals may not be copyable. This may be because of high levels of noise, coding of the message, transmission in a foreign language or other reasons.

## SOFTWARE CONSIDERATIONS

The interface may be adapted to most software by using the general purpose connector and setting the DIP switches to the proper positions as covered in the section on internal controls. If you wish to use the 5 pin, K-connector, the PTT control has to be considered.

The PTT switch for Kantronics operation is controlled by the combinations of the RTTY and CW ID lines. The four combinations are listed below:

| RTTY | CW ID | PTT | T/L | TONE |
|---|---|---|---|---|
| HIGH | HIGH | OFF | RECEIVE | 2175 CW ID PRODUCED BUT NOT TRANSMITTED |
| HIGH | LOW | ON | TRANSMIT | 2295 or 295 SPACE |
| LOW | HIGH | ON | TRANSMIT | 2175 CW ID |
| LOW | LOW | ON | TRANSMIT | 2175 MARK |

KAN BLACK 6 GND BLACK
GREEN 8 DEMOD BROWN MFJ
WHITE 3 CWKEY SHIELD
RED 2 RTTY WHITE
BROWN 1 CWID GREEN

1 2 3 4 5
6 7 8 9

## BACK PANEL

The MFJ-1224 provides inputs and outputs to allow interfacing to nearly any possible combination of computer and transceiver. The back panel diagram below shows all the interface connections and the paragraphs below describe their uses. Only a few of the available connections will be used for any given application; however, the availability of a variety of signals greatly enhances the versatility of the interface.

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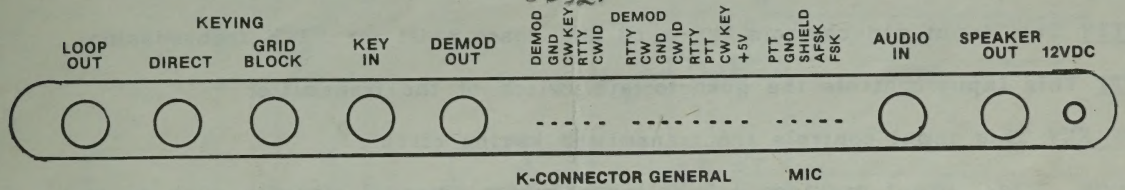



LOOP OUT The loop-out jack provides the ground return current to drive loop type teletypes. The user must provide the supply voltage to the center pin and ground to the sleeve.

DIRECT KEYING This output keys rigs requiring direct keying (most rigs with solid state finals).

GRID BLOCK KEYING This output keys rigs requiring grid block keying (most rigs with tube finals).

KEY IN The keying input jack allows you to externally key the transmitter with your own electronic keyer or keyboard.

DEMOD OUT The demodulated output provides a TTL level signal which corresponds to the incoming RTTY or CW signal. This output is high on RTTY mark and low on RTTY space. It is also low for CW tone.

The next connector is a five pin jack, labled K-connector because it is specifically designed for use with Kantronics software. From left to right the pins are as follows:

DEMOD This pin produces the same output as the DEMOD OUT jack.

GROUND This pin provides the ground connection between the interface and the computer.

CW KEY This input pin allows the computer to key the transmitter through the interface. A low on this pin causes the interface to key the transmitter.

RTTY This input controls the AFSK for RTTY transmission. It works in conjunction with CW ID signals and to operate the push-to -talk switch. This will be covered in detail later.

CW ID This line controls the audio tone for CW identification. It works in conjunction with the RTTY line to produce RTTY and CW ID signals and operate the push-to-talk switch. This will be covered in detail later.

Next is an eight pin general purpose connector which allows you to adapt the interface to almost any computer and software. An internal DIP switch allows the inputs and outputs to be inverted if necessary to correspond to the requirements of your computer. From left to right, the pins are as follows :

RTTY DEMOD This output is a TTL version of a received RTTY signal.

GROUND This pin provides the ground connection between the interface and the computer.

CW ID This input pin controls the mark frequency for CW ID transmission.

RTTY This input pin controls the mark and space shift for RTTY transmission.

PTT This input controls the push-to-talk switch of the transmitter.

CW KEY This input controls the transmitter keying circuit.

+5VDC This output provides a 5 volt supply for external circuity such as an RS-232 converter.

Next is a five-pin jack which is used for the microphone connection. From left to right, the pins are as follows:

PTT OUT This pin is connected to the high side of the push-to -talk line. It is shorted to ground to key the microphone.

PTT GROUND This pin is connected to the ground side of the push-to-talk line.

AFSK SHIELD This pin is connected to the ground for the shield side of the AFSK line.

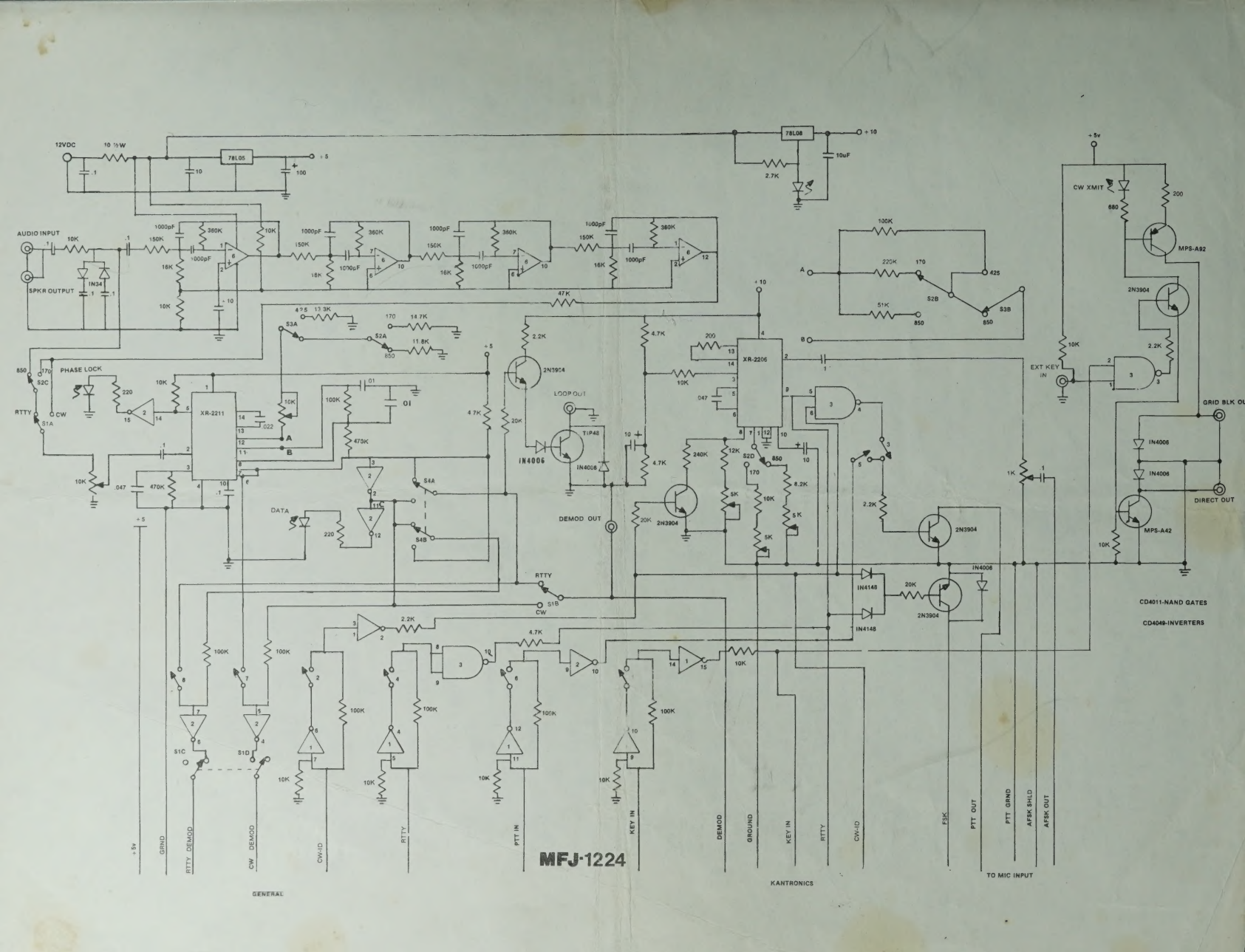
AFSK OUT This line carries the audio signal for AFSK RTTY to the microphone input.

FSK OUT This line provides the FSK signal for keying FSK rigs.

AUDIO IN The audio input jack should be connected to the external speaker jack or headphone jack of your receiver with a shielded audio cable. The interface end of the cable requires an RCA type phono plug.

SPEAKER OUT The speaker output jack may be connected to a speaker using shielded audio cable. The interface end of the cable requires an RCA type phono plug.

12VDC The power jack requires 12VDC from a 2.5mm subminiature plug with the tip positive and the sleeve ground.


MFJ-1224
12VDC
78L05
78L08
AUDIO INPUT
SPKR OUTPUT
PHASE LOCK
XR-2211
XR-2206
LOOP OUT
DEMOD OUT
DATA
RTTY
CW
CW XMIT
EXT KEY IN
GRID BLK OUT
DIRECT OUT
MPS-A92
MPS-A42
2N3904
TIP48
IN4006
IN4148
CD4011-NAND GATES
CD4049-INVERTERS
GENERAL
KANTRONICS
TO MIC INPUT
+5v
GRND
RTTY DEMOD
CW DEMOD
CW-ID
RTTY
PTT IN
KEY IN
DEMOD
GROUND
KEY IN
RTTY
CW-ID
FSK
PTT OUT
PTT GRND
AFSK SHLD
AFSK OUT

## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
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9. This warranty is given in lieu of any other warranty express or implied.
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